

- DESCRIPTION:** Students will solve problems using their knowledge of Molecular Genetics and Biotechnology.

A TEAM OF UP TO: 2

APPROXIMATE TIME: 50 minutes

- EVENT PARAMETERS:** Each team may bring **only** one 8.5" x 11" two-sided page of notes that contains information in any form from any source and up to 2 non-programmable, non-graphing calculators.
- THE COMPETITION:** This event may be run at stations and may include observations, inferences, predictions, data analysis, and calculations. Every attempt should be made to avoid over-emphasis on a particular area. **At the various levels, possible areas to be tested are limited to the basic principles of genetics (see Heredity-B event training on SO website) plus the following topics:**



Regional and State	Regional and State	National (all topics)
DNA structure & function	Lac & Trp Operons	Restriction mapping
DNA Semi-conservative Replication	DNA Fingerprinting/RFLP	Mitochondrial DNA
Gene expression (transcription and translation)	DNA Sequencing	DNA Repair
Control and detection of gene expression	Plasmid selection and isolation	Post- transcriptional modification
Mutations	PCR	Trinucleotide repeats
DNA Sequencing	Gene therapy	Epigenetics

- EXAMPLES:**
 - Which among several DNA sequences would result in a different amino acid sequence?
 - A cell biologist introduced radio-labeled thymine into the cell culture medium. After one round of replication, what percent of the daughter cells would be radioactive?
 - Describe how RNA is processed post-transcriptionally.
 - Explain why restriction digestion of DNA results in unique banding patterns after gel electrophoresis.
 - Describe the structure of the lac and trp operons and how metabolite levels affect their regulation.
- SCORING:** Highest number of correct solutions will determine the winner. Selected questions may be used as tiebreakers.

Recommended Resources: All reference and training resources including the **Bio/Earth CD** and the in-depth **Genetics CD** are available on the Official Science Olympiad Store or Website at www.soinc.org